

## SEQUENCE LISTING

<110> Maxygen ApS  
 Maxygen Holdings Ltd.  
 Haaning, Jesper Mortensen  
 Andersen, Kim Vilbour  
 Röpke, Mads  
 Glazer, Steven

<120> FVII or FVIIa Variants

<130> 0272wo310

<150> US 60/456,547

<151> 2003-03-20

<150> US 60/479,708

<151> 2003-06-19

<160> 19

<170> PatentIn version 3.2

<210> 1

<211> 1338

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (115) .. (1338)

<400> 1

atggtcagcc aggccctccg cctcctgtgc ctgctcctgg ggctgcaggg ctgcctggct 60

gccgtcttcg tcacccagga ggaagcccat ggcgtcctgc atcgccggcg ccgg gcc 117  
 Ala  
 1

aat gcc ttt ctg gaa gag ctc cgc cct ggc tcc ctg gaa cgc gaa tgc 165  
 Asn Ala Phe Leu Glu Glu Leu Arg Pro Gly Ser Leu Glu Arg Glu Cys  
 5 10 15

aaa gag gaa cag tgc agc ttt gag gaa gcc cgg gag att ttc aaa gac 213  
 Lys Glu Glu Gln Cys Ser Phe Glu Glu Ala Arg Glu Ile Phe Lys Asp  
 20 25 30

gct gag cgg acc aaa ctg ttt tgg att agc tat agc gat ggc gat cag 261  
 Ala Glu Arg Thr Lys Leu Phe Trp Ile Ser Tyr Ser Asp Gly Asp Gln  
 35 40 45

tgc gcc tcc agc cct tgc cag aac ggg ggc tcc tgc aaa gac cag ctg 309  
 Cys Ala Ser Ser Pro Cys Gln Asn Gly Gly Ser Cys Lys Asp Gln Leu  
 50 55 60 65

cag agc tat atc tgc ttc tgc ctg cct gcc ttt gag ggg cgc aat tgc 357  
 Gln Ser Tyr Ile Cys Phe Cys Leu Pro Ala Phe Glu Gly Arg Asn Cys  
 70 75 80

gaa acc cat aag gat gac cag ctg att tgc gtc aac gaa aac ggg ggc 405  
 Glu Thr His Lys Asp Asp Gln Leu Ile Cys Val Asn Glu Asn Gly Gly  
 85 90 95

tgc gag cag tac tgc agc gat cac acg ggc acg aag cgg agc tgc cgc 453  
 Cys Glu Gln Tyr Cys Ser Asp His Thr Gly Thr Lys Arg Ser Cys Arg  
 100 105 110

tgc cac gaa ggc tat agc ctc ctg gct gac ggg gtg tcc tgc acg ccc 501

Cys	His	Glu	Gly	Tyr	Ser	Leu	Leu	Ala	Asp	Gly	Val	Ser	Cys	Thr	Pro	
115						120					125					
acg	gtg	gaa	tac	cct	tgc	ggg	aag	att	ccc	att	cta	gaa	aag	cgg	aac	549
Thr	Val	Glu	Tyr	Pro	Cys	Gly	Lys	Ile	Pro	Ile	Leu	Glu	Lys	Arg	Asn	
130					135					140					145	
gct	agc	aaa	ccc	cag	ggc	cgg	atc	gtc	ggc	ggg	aag	gtc	tgc	cct	aag	597
Ala	Ser	Lys	Pro	Gln	Gly	Arg	Ile	Val	Gly	Gly	Lys	Val	Cys	Pro	Lys	
				150					155					160		
ggg	gag	tgc	ccc	tgg	cag	gtc	ctg	ctc	ctg	gtc	aac	ggg	gcc	cag	ctg	645
Gly	Glu	Cys	Pro	Trp	Gln	Val	Leu	Leu	Leu	Val	Asn	Gly	Ala	Gln	Leu	
			165				170					175				
tgc	ggc	ggg	acc	ctc	atc	aat	acc	att	tgg	gtc	gtg	tcc	gcc	gct	cac	693
Cys	Gly	Gly	Thr	Leu	Ile	Asn	Thr	Ile	Trp	Val	Val	Ser	Ala	Ala	His	
		180					185					190				
tgc	ttc	gat	aag	att	aag	aat	tgg	cgg	aac	ctc	atc	gct	gtg	ctc	ggc	741
Cys	Phe	Asp	Lys	Ile	Lys	Asn	Trp	Arg	Asn	Leu	Ile	Ala	Val	Leu	Gly	
	195					200					205					
gaa	cac	gat	ctg	tcc	gag	cat	gac	ggg	gac	gaa	cag	tcc	cgc	cgg	gtg	789
Glu	His	Asp	Leu	Ser	Glu	His	Asp	Gly	Asp	Glu	Gln	Ser	Arg	Arg	Val	
210					215					220					225	
gct	cag	gtc	atc	att	ccc	tcc	acc	tat	gtg	cct	ggc	acg	acc	aat	cac	837
Ala	Gln	Val	Ile	Ile	Pro	Ser	Thr	Tyr	Val	Pro	Gly	Thr	Thr	Asn	His	
				230					235					240		
gat	atc	gct	ctg	ctc	cgc	ctc	cac	cag	ccc	gtc	gtg	ctc	acc	gat	cac	885
Asp	Ile	Ala	Leu	Leu	Arg	Leu	His	Gln	Pro	Val	Val	Leu	Thr	Asp	His	
			245					250					255			
gtc	gtg	cct	ctg	tgc	ctg	cct	gag	cgg	acc	ttt	agc	gaa	cgc	acg	ctg	933
Val	Val	Pro	Leu	Cys	Leu	Pro	Glu	Arg	Thr	Phe	Ser	Glu	Arg	Thr	Leu	
		260					265					270				
gct	ttc	gtc	cgc	ttt	agc	ctc	gtg	tcc	ggc	tgg	ggc	cag	ctg	ctc	gac	981
Ala	Phe	Val	Arg	Phe	Ser	Leu	Val	Ser	Gly	Trp	Gly	Gln	Leu	Leu	Asp	
	275					280					285					
cgg	ggc	gct	acc	gct	ctc	gag	ctg	atg	gtg	ctc	aac	gtc	ccc	cgg	ctg	1029
Arg	Gly	Ala	Thr	Ala	Leu	Glu	Leu	Met	Val	Leu	Asn	Val	Pro	Arg	Leu	
290					295					300					305	
atg	acc	cag	gac	tgc	ctg	cag	cag	tcc	cgc	aaa	gtg	ggg	gac	tcc	ccc	1077
Met	Thr	Gln	Asp	Cys	Leu	Gln	Gln	Ser	Arg	Lys	Val	Gly	Asp	Ser	Pro	
				310					315					320		
aat	atc	acg	gag	tat	atg	ttt	tgc	gct	ggc	tat	agc	gat	ggc	tcc	aag	1125
Asn	Ile	Thr	Glu	Tyr	Met	Phe	Cys	Ala	Gly	Tyr	Ser	Asp	Gly	Ser	Lys	
			325					330					335			
gat	agc	tgc	aag	ggg	gac	tcc	ggc	ggg	ccc	cat	gcc	acg	cac	tat	cgc	1173
Asp	Ser	Cys	Lys	Gly	Asp	Ser	Gly	Gly	Pro	His	Ala	Thr	His	Tyr	Arg	
		340					345					350				
ggg	acc	tgg	tac	ctc	acc	ggg	atc	gtc	agc	tgg	ggc	cag	ggc	tgc	gcc	1221
Gly	Thr	Trp	Tyr	Leu	Thr	Gly	Ile	Val	Ser	Trp	Gly	Gln	Gly	Cys	Ala	
		355				360					365					
acg	gtg	ggg	cac	ttt	ggc	gtc	tac	acg	cgc	gtc	agc	cag	tac	att	gag	1269
Thr	Val	Gly	His	Phe	Gly	Val	Tyr	Thr	Arg	Val	Ser	Gln	Tyr	Ile	Glu	
370					375					380					385	
tgg	ctg	cag	aag	ctc	atg	cgg	agc	gaa	ccc	cgg	ccc	ggg	gtg	ctc	ctg	1317
Trp	Leu	Gln	Lys	Leu	Met	Arg	Ser	Glu	Pro	Arg	Pro	Gly	Val	Leu	Leu	

390 395 400 1338  
 cgg gcc cct ttc cct tga taa  
 Arg Ala Pro Phe Pro  
 405  
 <210> 2  
 <211> 406  
 <212> PRT  
 <213> Homo sapiens  
 <400> 2  
 Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro Gly Ser Leu Glu Arg Glu  
 1 5 10 15  
 Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu Ala Arg Glu Ile Phe Lys  
 20 25 30  
 Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile Ser Tyr Ser Asp Gly Asp  
 35 40 45  
 Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly Gly Ser Cys Lys Asp Gln  
 50 55 60  
 Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro Ala Phe Glu Gly Arg Asn  
 65 70 75 80  
 Cys Glu Thr His Lys Asp Asp Gln Leu Ile Cys Val Asn Glu Asn Gly  
 85 90 95  
 Gly Cys Glu Gln Tyr Cys Ser Asp His Thr Gly Thr Lys Arg Ser Cys  
 100 105 110  
 Arg Cys His Glu Gly Tyr Ser Leu Leu Ala Asp Gly Val Ser Cys Thr  
 115 120 125  
 Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile Pro Ile Leu Glu Lys Arg  
 130 135 140  
 Asn Ala Ser Lys Pro Gln Gly Arg Ile Val Gly Gly Lys Val Cys Pro  
 145 150 155 160  
 Lys Gly Glu Cys Pro Trp Gln Val Leu Leu Val Asn Gly Ala Gln  
 165 170 175  
 Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile Trp Val Val Ser Ala Ala  
 180 185 190  
 His Cys Phe Asp Lys Ile Lys Asn Trp Arg Asn Leu Ile Ala Val Leu  
 195 200 205  
 Gly Glu His Asp Leu Ser Glu His Asp Gly Asp Glu Gln Ser Arg Arg  
 210 215 220

Val Ala Gln Val Ile Ile Pro Ser Thr Tyr Val Pro Gly Thr Thr Asn  
225 230 235 240

His Asp Ile Ala Leu Leu Arg Leu His Gln Pro Val Val Leu Thr Asp  
245 250 255

His Val Val Pro Leu Cys Leu Pro Glu Arg Thr Phe Ser Glu Arg Thr  
260 265 270

Leu Ala Phe Val Arg Phe Ser Leu Val Ser Gly Trp Gly Gln Leu Leu  
275 280 285

Asp Arg Gly Ala Thr Ala Leu Glu Leu Met Val Leu Asn Val Pro Arg  
290 295 300

Leu Met Thr Gln Asp Cys Leu Gln Gln Ser Arg Lys Val Gly Asp Ser  
305 310 315 320

Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala Gly Tyr Ser Asp Gly Ser  
325 330 335

Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly Pro His Ala Thr His Tyr  
340 345 350

Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val Ser Trp Gly Gln Gly Cys  
355 360 365

Ala Thr Val Gly His Phe Gly Val Tyr Thr Arg Val Ser Gln Tyr Ile  
370 375 380

Glu Trp Leu Gln Lys Leu Met Arg Ser Glu Pro Arg Pro Gly Val Leu  
385 390 395 400

Leu Arg Ala Pro Phe Pro  
405

<210> 3  
<211> 1357  
<212> DNA  
<213> Artificial

<220>  
<223> Synthetic gene for optimized expression of hFVII

<400> 3  
ggatcccgcc accatgggtca gccaggccct ccgcctcctg tgcctgctcc tggggctgca 60  
gggctgcctg gctgccgtct tcgtcaccca ggaggaagcc catggcgctcc tgcacgccc 120  
gcgccggggcc aatgcctttc tggaagagct ccgccttggc tccctggaac gcgaatgcaa 180  
agaggaacag tgcagctttg aggaagcccg ggagattttc aaagacgctg agcggaccaa 240  
actgttttgg attagctata gcgatggcga tcagtgcgcc tccagccctt gccagaacgg 300  
gggctcctgc aaagaccagc tgcagagcta tatctgcttc tgcctgcctg cctttgaggg 360

gcgcaattgc gaaacccata aggatgacca gctgatttgc gtcaacgaaa acgggggctg 420  
 cgagcagtac tgcagcgatc acacgggcac gaagcgggagc tgccgctgcc acgaaggcta 480  
 tagcctcctg gctgacgggg tgtcctgcac gccacgggtg gaataccctt gcgggaagat 540  
 tcccattcta gaaaagcgga acgctagcaa accccagggc cggatcgctg gcgggaaggt 600  
 ctgccctaag ggggagtgcc cctggcaggt cctgctcctg gtcaacgggg cccagctgtg 660  
 cggcgggacc ctcatcaata ccatttgggc cgtgtccgcc gctcactgct tcgataagat 720  
 taagaattgg cggaacctca tcgctgtgct cggcgaacac gatctgtccg agcatgacgg 780  
 ggacgaacag tcccgccggg tggctcaggt catcattccc tccacctatg tgccctggcac 840  
 gaccaatcac gatatcgctc tgctccgcct ccaccagccc gtcgtgctca ccgatcacgt 900  
 cgtgcctctg tgccctgcctg agcgggacctt tagcgaacgc acgctggctt tcgtccgctt 960  
 tagcctcgtg tccggctggg gccagctgct cgaccggggc gctaccgctc tcgagctgat 1020  
 ggtgctcaac gtcccccgcc tgatgacca ggactgcctg cagcagtccc gcaaagtggg 1080  
 ggactcccc aatatcacgg agtatatgtt ttgcgtggc tatagcgatg gctccaagga 1140  
 tagctgcaag ggggactccg gcgggcccc tgccacgcac tatcgcgga cctggtacct 1200  
 caccgggatc gtcagctggg gccagggctg cgccacgggt gggcactttg gcgtctacac 1260  
 gcgcgtcagc cagtacattg agtggctgca gaagctcatg cggagcgaac cccggcccgg 1320  
 ggtgctcctg cgggcccctt tcccttgata aaagctt 1357

<210> 4  
 <211> 31  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer

<400> 4  
 agctggctag ccactgggca ggtaagtatc a 31

<210> 5  
 <211> 31  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer

<400> 5  
 tggcgggatc cttaagagct gtaattgaac t 31

<210> 6  
 <211> 38  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Primer

<400> 6

cccattctag aaaagcggaa cgccagcaaa ccccaggg

38

<210> 7  
<211> 34  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 7  
ccaattctta atcttggtga agcagtgagc ggcg

34

<210> 8  
<211> 21  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 8  
ctccgtgata ttgggggagt c

21

<210> 9  
<211> 34  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 9  
cgccgctcac tgcttcaaca agattaagaa ttgg

34

<210> 10  
<211> 22  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 10  
cgctctcgag ctgatggtgc tc

22

<210> 11  
<211> 22  
<212> DNA  
<213> Artificial

<220>  
<223> Primer

<400> 11  
caaacaacag atggctggca ac

22

<210> 12  
<211> 34  
<212> DNA  
<213> Artificial

<220>

<223> Primer

<400> 12

cgccgctcac tgcttcaaga agattaagaa ttgg

34

<210> 13

<211> 34

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 13

ccaattctta atcttcttga agcagtgagc ggcg

34

<210> 14

<211> 33

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 14

ctccacctat gtgcctctga cgaccaatca cga

33

<210> 15

<211> 33

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 15

tcgtgattgg tcgtcagagg cacatagggtg gag

33

<210> 16

<211> 29

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 16

ccaaggatgc caggggggact ccggcgggc

29

<210> 17

<211> 33

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 17

gcccgcgga gtccccctgg cagctatcct tgg

33

<210> 18

<211> 36

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 18

acctatgtgc ctggcgctgc cagaccaat cacgat

36

<210> 19

<211> 36

<212> DNA

<213> Artificial

<220>

<223> Primer

<400> 19

atcgtgattg gtcgtggcag cgccaggcac ataggt

36